
Fort Bragg
AIRBORNE
AIRBORNE
AIRBORNE
Home of the Airborne & Special Operations

Energy Brief

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Fort Bragg

FORT BRAGG - "More Than A City"

Size: 251 Square Miles (160,770 Acres)

- Buildings: 31.1M SF
- Shopping Centers: 11
- Restaurants: 28
- Railroad Lines: 19 miles
- Roads and Utilities
  - 1,442 Lane Miles Paved Roads
  - Utilities: Water, Waste Water, Electricity, Natural Gas
- IT Structure
  - 667 miles fiber optic cable
  - 11,359 miles copper cable
- Simmons Army Airfield: 579 Acres
- Camp Mackall: 7,934 Acres
- Museums: 3
- Hospital: 1
  - Medical Clinics: 14
  - Dental Clinics: 6
- Schools
  - Elementary: 7
  - Junior High/Middle: 2
- Army Family Housing
  - 4,744 On-Post
  - 250 Off-Post
  - (Approximately 27,000 Soldiers Reside Off-Post)
- Churches: 11
- Consolidated Library: 1
- Child Care Centers: 4
- Recreational Facilities: 239

Total Population Supported: 241, 388

Ft. Bragg

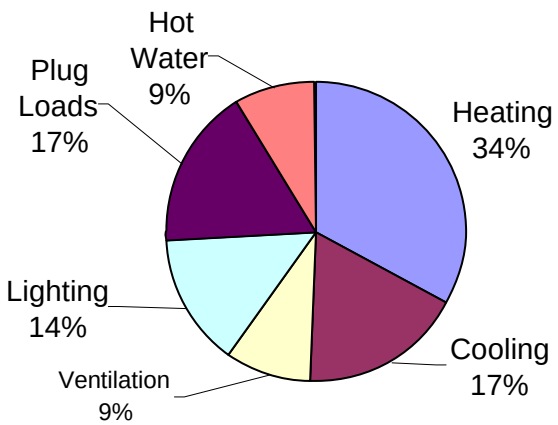
- **Current and Projected Energy Cost and Consumption**

Fiscal Year	Power Cost	KWh Consumed	Fuel Cost	Fuel Consumed (Btu)	Total Energy Cost
FY 1997	$23,778,036	438,340,828	$7,619,382	1,666,823	31,397,418
FY 1998	$24,956,335	476,981,425	$8,220,906	1,647,718	33,177,241
FY 1999	$24,750,153	490,503,048	$5,951,363	1,497,173	30,701,516
FY 2000	$22,716,358	496,206,161	$5,633,156	1,400,196	28,349,514
FY 2001	$22,864,574	529,185,789	$10,292,337	1,439,297	33,156,911
FY 2002	$23,314,405	519,369,320	$6,027,701	1,208,192	29,342,106
FY 2003	$24,086,157	528,474,190	$8,490,921	1,434,586	32,577,079
FY 2004	$25,687,080	539,470,144	$10,022,401	1,480,466	35,709,481
FY2005	$28,149,514	551,127,636	$12,918,951	1,597,610	41,068,465
FY 2006	$30,799,213	560,019,278	$17,509,982	1,338,429	50,291,064
FY 2007	$42,499,772	722,785,241	$13,428,071	1,983,536	55,927,843
FY 2008	$45,315,492	785,636,132	$14,595,730	2,156,018	59,911,222
FY 2009	$49,847,041	864,199,745	$16,055,303	2,371,619	65,902,344
FY 2010	$51,357,558	890,387,616	$16,541,827	2,443,487	67,899,385

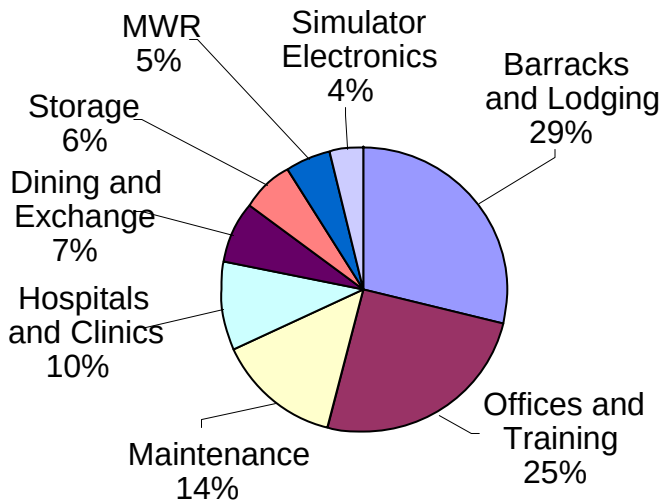
Ft. Bragg Load Profiles

Where did all the Energy go?

Fort Bragg Energy Use by End-Use



Fort Bragg Energy Use by Building Type



- 60% of Energy Use is for HVAC

ESPC Contract Figures

DO/TO #	ENERGY CONSERVATION MEASURE INSTALLED	AWARD DATE	COMP DATE	MMBTU/ YR SAVINGS	TOTAL INVESTMENT VALUE ($)	AMOUNT PRIVATELY FINANCED($)	ANNUAL COST SAVINGS ($)	CUMULATIVE COST SAVINGS ($)	TOTAL CONTRACT AWARD VALUE ($)	ANNUAL PAYMENT ($)	TERM LENGTH
1	SAAF - Lighting, Boilers, NG	04/13/98	8/1/98	1,388	$240,000	$240,000	$28,302	$548,914	$539,517	$0	18.83
2	SAAF - Lighting, Boilers, NG	04/17/98	12/1/98	51,514	$7,241,101	$7,241,101	$1,000,704	$22,226,811	$20,383,129	$903,382	23.00
3	O'Club Upgrade - Lighting, Heating, Cooling, Controls, Motor Replacement, Daylighting Controls	12/30/98	8/1/99	426	$489,531	$489,531	$75,663	$1,565,519	$1,514,052	$72,112	21.50
4	JSOC Upgrades - Lighting, HVAC, Controls, Peak Shaving	02/08/99	1/1/00	7,248	$3,100,000	$3,100,000	$529,935	$7,448,060	$6,824,151	$417,190	16.75
5	82nd Airborne - Lighting	03/11/99	12/1/99	21,934	$3,364,066	$3,364,066	$648,190	$12,220,726	$11,197,015	$608,908	18.83
6	C Area Barracks - Lighting	05/28/99	9/1/99	6,219	$402,365	$402,365	$150,413	$1,028,990	$942,788	$137,917	7.00
7	Knox St. Warehouse - Lighting, Heating,Controls	07/01/99	1/1/00	11,048	$886,644	$886,644	$144,682	$3,077,041	$2,819,275	$129,750	22.25
8	A-Area VMF - Lighting, Heating,Controls	09/15/99	5/1/00	17,074	$724,148	$724,148	$103,706	$2,063,440	$1,890,600	$96,798	20.00
9	NCO & Enlisted Clubs - Lighting,Controls	09/08/99	12/30/99	2,317	$178,194	$178,194	$24,600	$497,771	$506,740	$23,771	21.83
10	C-Area VMF -Heating,Controls	09/15/99	3/1/00	14,447	$590,381	$590,381	$92,740	$1,655,796	$1,614,094	$88,151	18.75
11	Old Womack Hosp. Boiler Plant - Heating	03/03/00	3/1/01	14,100	$1,627,611	$1,627,611	$375,264	$4,151,274	$4,014,841	$212,685	19.33
12	Total Energy Account Mgmt (Electric Load Mgmt) 1-12	02/23/00	3/2/02	120,152	$58,418,037	$54,418,037	$8,539,931	$135,938,011	$174,388,911	$12,059,879	15.60
12.1	GAS Amortization - Natural Gas	02/23/00	1/1/00		$262,692	$262,692	$589,814	$9,477,131	$1,737,450	$113,936	
12.2	Load Mgmt	06/27/00	1/1/00		$882,605	$882,605	$4,340,000	$69,735,120	$4,113,205	$263,667	
12.3	PT Facility - Lighting, HVAC, Controls	06/30/00	5/1/01		$791,128	$791,128	$79,536	$1,277,984	$1,647,922	$105,845	
12.4	MMD Facility - Lighting, HVAC, Controls, Comp Air	08/16/00	9/1/01		$1,351,868	$1,351,868	$164,485	$2,642,945	$3,359,741	$215,969	
12.5	SOTF -Lighting, HVAC, Controls, Peak Shaving	09/21/00	8/1/01		$2,053,000	$2,053,000	$276,537	$4,443,397	$4,859,993	$311,708	
12.6	MainPost - Lighting, HVAC, Controls	09/21/00	6/1/01		$1,768,000	$1,768,000	$307,386	$4,939,078	$5,247,902	$338,831	
12.7	Metering I - Metering, Monitoring, EIS	09/21/00	1/1/02		$1,541,583	$1,541,583	$0	$0	$4,272,715	$273,892	
12.8	Metering II -Metering, EIS II	12/11/00	3/1/02		$3,042,729	$3,042,729	$0	$0	$12,998,014	$833,206	
12.9	CMA Plant - Heating, Cooling, Controls	12/11/00	4/1/02		$10,087,204	$10,087,204	$340,131	$5,465,225	$24,763,066	$1,589,616	
12.10	Central Plants - HVAC, Controls, Load Mgmt, O&M	10/18/01	3/1/03		$12,551,424	$12,551,424	$1,242,042	$19,957,131	$64,837,672	$4,218,065	
12.11	CoGen - Cogeneration, Controls, Cooling	09/30/02	3/30/04		$12,085,804	$12,085,804	$0	$0	$33,551,232	$1,795,143	
12.12	Steam line modifications	08/28/04	09/01/05	1,698,244	$12,000,000	$8,000,000	$1,200,000	$18,000,000	$13,000,000	$2,000,000	
13	Cleland Ice Rink - Lighting, HVAC, Controls	05/31/01	12/1/01	4,420	$630,340	$630,340	$110,028	$1,612,452	$1,556,320	$78,602	19.80
14	Post-wide Lighting	09/19/01	3/1/02	24,431	$3,662,149	$3,662,149	$664,776	$8,832,879	$711,400	$0	12.90
TOTALS				**1,994,962**	**$81,554,567**	**$77,554,567**	**$12,488,934**	**$202,867,683**	**$228,902,832**	**$14,829,144**	

Fort Bragg Co-Generation Operating Parameters

- Fuel burn for 5.2 MW – 55 Dt/hr
- Produces 27,000 lb/hr of steam with no additional fuel
- Produces up to 80,000 lb/hr with supplemental firing

Or

- Produces 1,000 tons of cooling
  - Inlet air cooling
  - District cooling
- Steam as required

A LOT OF MILITARY CONSTRUCTION!!!

21 Years Of MCA Construction

FY 85	$	108,100,000
FY 86	$	65,100,000
FY 87	$	23,700,000
FY 88	$	37,000,000
FY 89	$	36,800,000
FY 90	$	59,600,000
FY 91	$	53,000,000
FY 92	$	65,900,000
FY 93	$	12,700,000
FY 94	$	202,775,000
FY 95	$	135,505,000
FY 96	$	60,035,000
FY 97	$	143,687,000
FY 98	$	58,306,000
FY 99	$	147,340,000
FY 00	$	75,724,000
FY 01	$	159,762,000
FY 02	$	198,135,000
FY 03	$	195,860,000
FY 04	$	148,900,000
FY 05	$	182,700,000
TOTAL	$	2,170,629,000

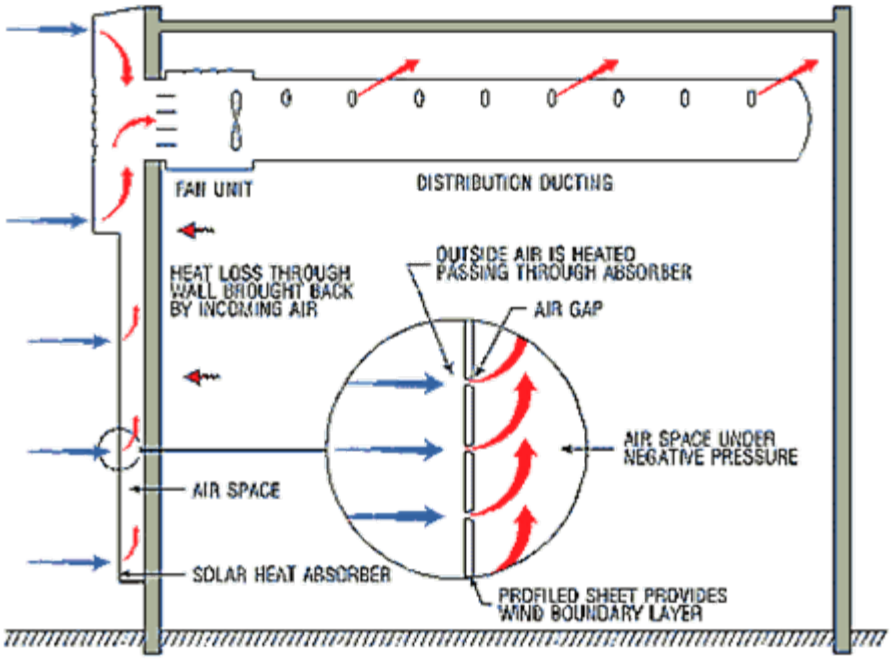
Growth of 10 Million SF In 21 Years

Construction Budget FY06 – FY11
FYDP + BRAC + Modular Force + PMH

FY 06	$	212,111,000
FY 07	$	368,244,000
FY 08	$	179,950,000
FY 09	$	285,250,000
FY 10	$	371,345,000
FY 11	$	338,650,000
PMH	$	457,000,000
Other Projects	$	469,000,000
TOTAL	$	2,671,550,000

“Golden”Home of Fort Bragg’s Elite Parachute Team

The Right Way…The Green Way…All the Way!



SOLARWALL® Performance and Economics

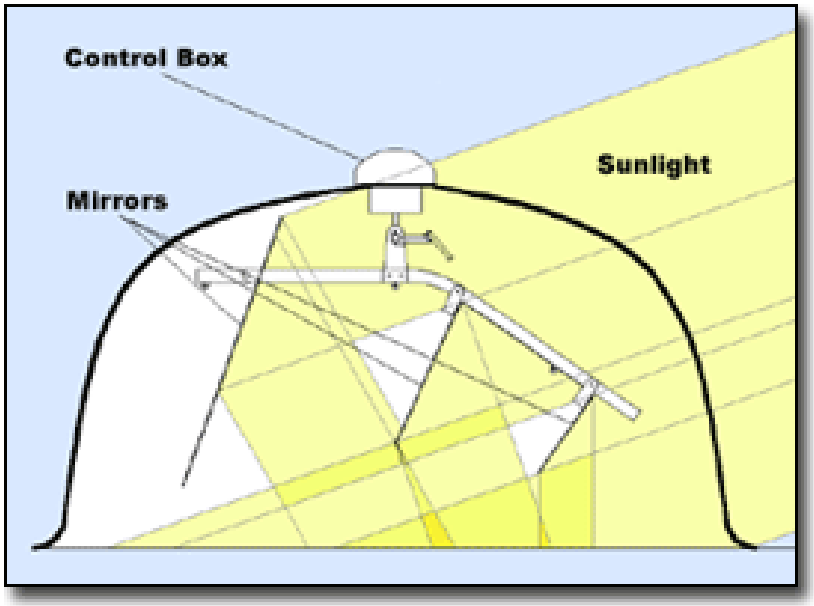
Operating Efficiency: up to 75%

Estimated RSI value: 9 (R-value: 50)

Annual Energy Savings: $1- $6/ft2 ($10 - $60/m2)

Estimated Payback Period:

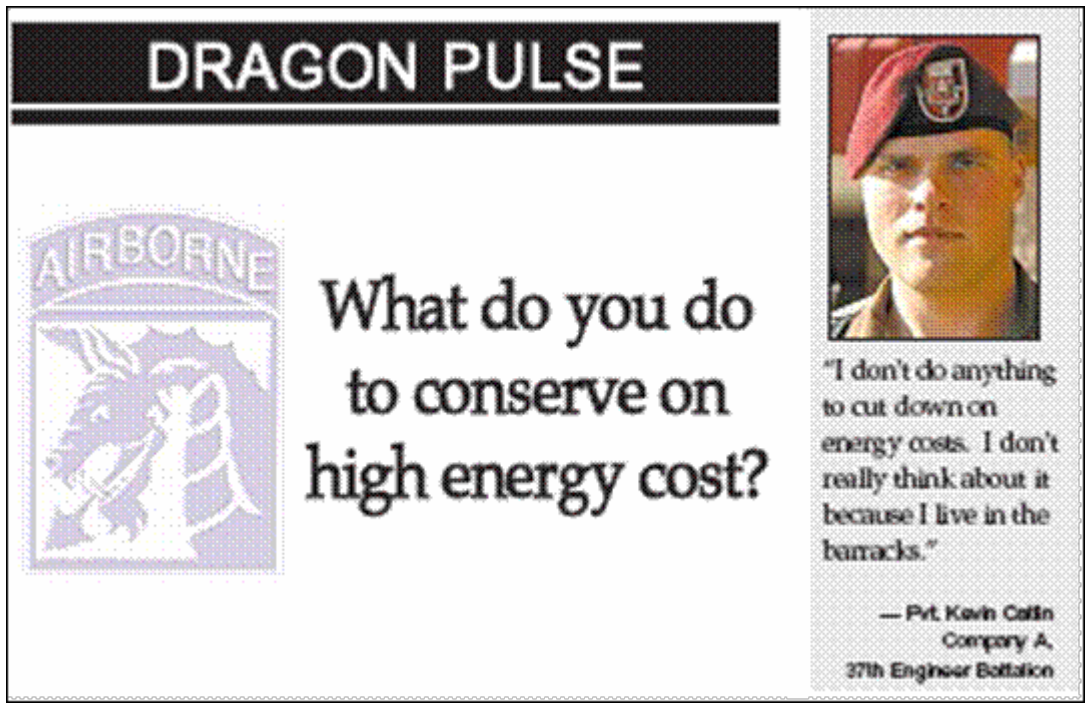
- New: 0 - 3 Years
- Retrofit: 3 - 8 Years



Active Daylighting Class IX Warehouse

- Four ADS-2000 Active Daylighting Systems installed in dark aisle and over work space
- Workers claim “200% improvement” over artificial electric lighting
- Fixtures are more expensive, but less are required
- Payback in under two years with energy savings
- DOL saved $16K on lighting project by using less electric lights and switching to daylighting systems in design

Energy Awareness



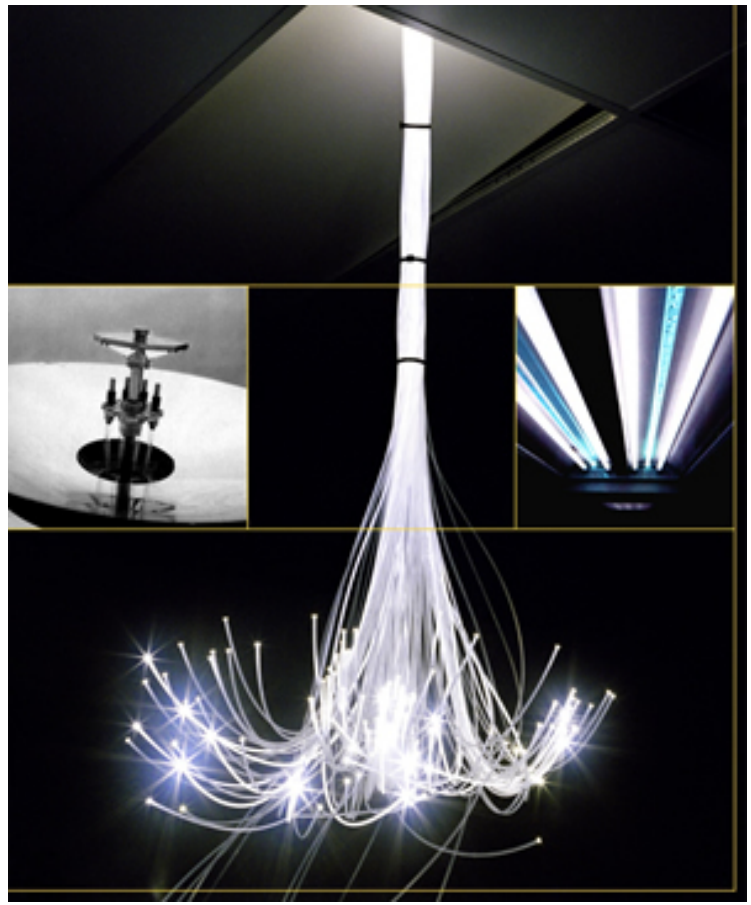
Geothermal

- McKellar's Lodge offers opportunities for utilizing lake cooling

- The Historic District has ample green space available for horizontal loops

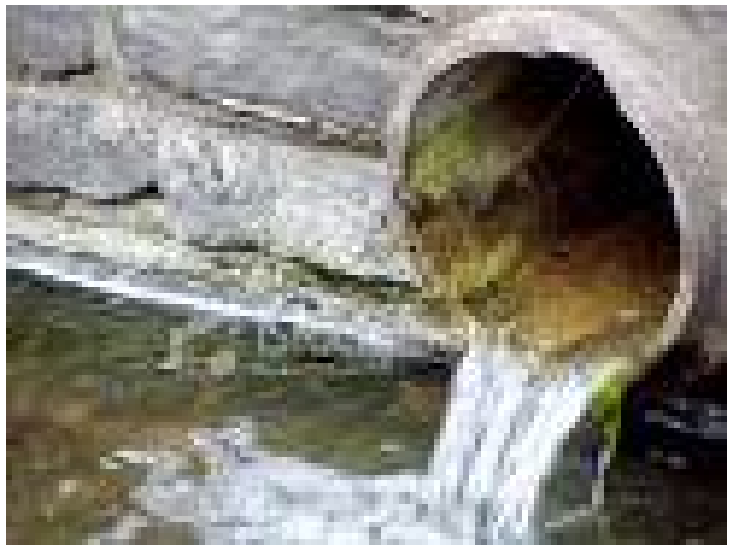
Hybrid Lighting

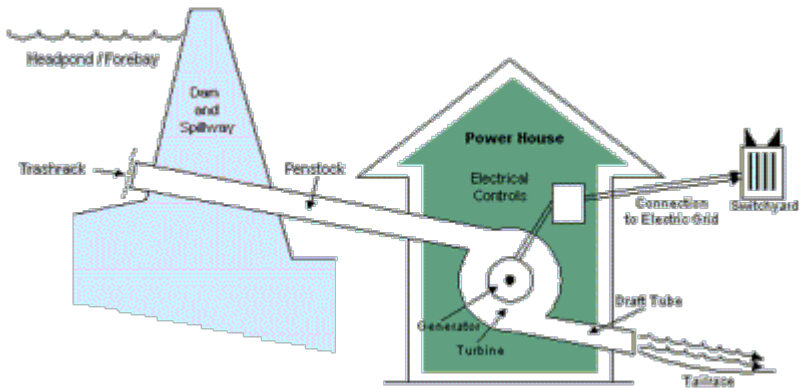
A: A prototype rooftop collector focuses solar rays into a set of half-inch-wide polymer fibers that are capped in heat-resistant quartz. **B:** The sunlight flows into a building through a network of exceptionally transparent fiber-optic cables. **C:** The fibers transmit 40 to 45 percent of the incoming sunlight into a ceiling fixture containing two acrylic rods that are etched to scatter the light evenly; the adjacent fluorescent bulbs fill in when sunshine alone is too weak to illuminate the room. Researchers at Oak Ridge National Laboratory hope that piped-in sunlight will put a serious dent in the amount of energy used to light commercial buildings, which accounts for about 10 percent of all electricity consumption in the United States. Photovoltaic cells placed behind the collector's secondary mirror could augment the savings by converting the sun's invisible infrared rays into electricity.



Small Hydropower

- Utilize WTP, WWTP, distribution systems, discharges, etc.





No Wind in NC?

Wind from the Ft. Bragg free fall simulator is not captured!

Biomass

- The MOST solid waste in the Army
- Centrally located in the “Saudi Arabia” of biofuels
- Regional partnering opportunities (Sustainable Sandhills, Walmart, etc.)